

## HOCKEY PUCK

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates generally to hockey pucks, and more particularly, to a hockey puck having central and peripheral plugs for improved weight distribution and/or performance over prior art hockey pucks.

#### 2. Prior Art

Hockey pucks are known in the art which have inserts or plugs disposed in a solid body. One such hockey puck is manufactured by PROPUCK® and has eight inserts disposed around a periphery of the hockey puck. Although the PROPUCK and other similar pucks known in the art have their advantages, they suffer from poor weight distribution which affects their performance when being struck and/or sliding along a playing surface.

### SUMMARY OF THE INVENTION

Therefore it is an object of the present invention to provide a hockey puck that overcomes the disadvantages of the prior art hockey pucks.

Accordingly, a hockey puck is provided. The hockey puck comprising: a disc shaped body having an upper and lower surface, the disc shaped body having a central opening and two or more peripheral openings surrounding the central opening, the central and two or more peripheral openings extending from the

upper surface to the lower surface; a central plug disposed in the central opening and extending above both the upper and lower surfaces; and a peripheral plug disposed in each of the two or more peripheral openings, at least some of the peripheral plugs extending above both the upper and lower surfaces.

The peripheral plugs can be fabricated from a denser material than the body. The peripheral plugs can be fabricated from Delrin<sup>®</sup> (Acetal Homopolymer) and similar materials and the body can be fabricated from SBR elastomer and similar materials.

The peripheral plugs can be sized such that they cover a substantial portion of the periphery of the upper and lower surfaces.

The peripheral plugs can be offset from a circumference of the disc shaped body towards the center plug such that no portion of the peripheral plugs are disposed at the circumference of the disc shaped body.

The central plug can be circular in cross-section when viewed from one of the upper and lower surfaces.

At least one of the two or more peripheral plugs can be oval in cross-section when viewed from one of the upper and lower surfaces.

The central plug can be circular in cross-section when viewed from one of the upper and lower surfaces and the two or more peripheral plugs can comprise three peripheral plugs, each of which being oval in cross-section when viewed from one of the upper and lower surfaces.

The central and two or more peripheral plugs can

comprise a surface area greater than a surface area of the disc shaped body excluding the central opening and two or more peripheral openings.

At least one of the central and one or more of the peripheral plugs can have an opening and can have at least a portion of the disc shaped body disposed therein for positively locking the at least one of the central and one or more of the peripheral plugs to the disc shaped body.

Also provided is a blank for a hockey puck. The blank comprising a disc shaped body having an upper and lower surface, the disc shaped body having a central opening and two or more peripheral openings surrounding the central opening, the central and two or more peripheral openings extending from the upper surface to the lower surface.

The peripheral openings can be sized such that they cover a substantial portion of the periphery of the upper and lower surfaces.

The central opening can be circular in cross-section when viewed from one of the upper and lower surfaces.

At least one of the two or more peripheral openings can be oval in cross-section when viewed from one of the upper and lower surfaces.

The central opening can be circular in cross-section when viewed from one of the upper and lower surfaces and the two or more peripheral openings can comprise three peripheral openings, each of which being oval in cross-section when viewed from one of the upper and lower surfaces.

The central and two or more peripheral openings can comprise an area greater than a surface area of the disc shaped body.

Further provided is a hockey puck comprising: a body having an upper and lower surface, the body having a central opening extending from the upper surface to the lower surface; and a central plug disposed in the central opening and extending above both the upper and lower surfaces.

Still further provided is a hockey puck comprising: a disc shaped body having an upper and lower surface, the disc shaped body having two or more peripheral openings; and a peripheral plug disposed in each of the two or more peripheral openings, at least some of the peripheral plugs extending above both the upper and lower surfaces, wherein the two or more peripheral plugs have a combined surface area greater than either one of the upper or lower surfaces excluding the two or more peripheral openings.

The hockey puck can further comprise a central plug disposed in a central opening formed in the disc shaped body, wherein a combined surface area of the central and two or more peripheral plugs have a combined surface area greater than either one of the upper or lower surfaces excluding the central opening and two or more peripheral openings.

Still yet further provided is a hockey puck comprising: a disc shaped body having an upper and lower surface, the disc shaped body having two or more peripheral openings; and a peripheral plug disposed in each of the two or more peripheral openings, at least some of the peripheral plugs extending above both the upper and lower surfaces, wherein the two or more

peripheral plugs are offset from a circumference of the disc shaped body such that no portion of the two or more peripheral plugs are disposed at the circumference.

The hockey puck can further comprise a central plug disposed in a central opening formed in the disc shaped body.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

These and other features, aspects, and advantages of the apparatus and methods of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings where:

Figure 1 illustrates an isometric view of a hockey puck according to an embodiment of the present invention.

Figure 2 illustrates a sectional view of the hockey puck of Figure 1 as taken along line 2-2 of Figure 1.

Figure 3 illustrates a body of the hockey puck of Figure 1 without the plugs inserted therein.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

Although this invention is applicable to numerous and various types of hockey pucks, it has been found particularly useful in the environment of hockey pucks for non-frozen playing surfaces. Therefore, without limiting the applicability of the invention to non-frozen playing surfaces, the invention will be described in such environment.

Referring now to Figures 1 and 2, there is shown a hockey puck according to an embodiment of the present invention, the hockey puck being generally referred to by reference numeral

100.

The hockey puck 100 has a disc shaped body 102. The disc shaped body 102 has an upper and lower surface 104, 106 and extends to a circumference 108. On each of the upper and lower surfaces 104, 106 of the disc shaped body 102 there is a first tapered portion 110 that tapers away from both a first central axis 112 and from the circumference 108 inward towards a second central axis 114. The first tapered portion 110 terminates at a first planar portion 116 that is substantially parallel with the first central axis 112. The first planar portion 116 terminates into a second tapered portion 118 that tapers towards both the first central axis 112 and towards the second central axis 114. The second tapered portion 118 terminates in a second planar portion 120 that is substantially parallel with the first central axis 112.

Referring now to Figures 2 and 3, the disc shaped body 102 further has a central opening 122 and two or more peripheral openings 124 surrounding the central opening 122. The central and two or more peripheral openings 122, 124 extend from the upper surface 104 to the lower surface 106 of the disc shaped body 102.

A central plug 126 is disposed in the central opening 122 and extends above both the upper and lower surfaces 104, 106 of the disc-shaped body 102. The central plug 126 is preferably larger in cross section than the diameter  $d_c$  of the central opening 122 to positively retain the central plug 126 in the central opening 122. The nature of the material of the central plug 126 and/or disc shaped body 102 allow the central plug 126 and/or disc shaped body 102 to be plastically deformed while being disposed in the central opening 122. Alternatively, the

central plug 126 can be insert molded in the disc-shaped body 102.

Similarly, a peripheral plug 128 is disposed in each of the two or more peripheral openings 124 such that at least some of the peripheral plugs 128 extend above both the upper and lower surfaces 104, 106. The peripheral plugs 128 are preferably larger in cross section than each diameter  $d_p$  of the peripheral opening 124 to positively retain peripheral plug 128 in the peripheral opening 124. As discussed above with regard to the central plug 126, the nature of the material of the peripheral plugs 128 and/or disc shaped body 102 allow the peripheral plugs 128 and/or disc shaped body 102 to be plastically deformed while being disposed in their respective peripheral opening 124.

Alternatively, the peripheral plugs 128 can be insert molded in the disc-shaped body 102. In which case, it is preferred that the peripheral and/or central pugs 126, 128 have an opening 126a, 128a, respectively for permitting the material of the body 102 to enter the openings 126a, 128a. Not only does this positively lock the central and/or peripheral plugs 126, 128 in place on the body 102, but it also allows the body to be compressed over its entire width when struck. The compression of the body 102 has been found to increase the performance of the puck 100.

The peripheral plugs 128 can be fabricated from a denser material than the body 102. For example, the peripheral plugs 128 can be fabricated from Delrin<sup>®</sup> (Acetal Homopolymer) and the body can be fabricated from SBR elastomer. Other materials having similar characteristics can also be used. Such materials are well known to those of ordinary skill in the art. Furthermore, the peripheral plugs 128 can be sized such that they cover a substantial portion of the periphery of the upper and

lower surfaces. The configuration shown in Figure 1 shows the plugs being substantially larger in the direction of the periphery than the spaces 130 between the peripheral plugs 128. Still further, the peripheral plugs 128 can be offset from the circumference 108 of the disc shaped body 102 towards the center plug 126 by a distance  $O_c$ . The offset  $O_c$  is such that no portion of the peripheral plugs 128 are disposed at the circumference 108 of the disc shaped body 102. The two or more peripheral plugs 128 with or without the central plug 126 can have a combined surface area that is greater than a surface area of the disc shaped body 102 (excluding the openings). Each of these features individually or in combination contributes to an improved weight distribution and other improved characteristics which improve the performance of the hockey puck 100 when struck and/or moving over a playing surface.

The central plug 126 can be circular in cross-section when viewed from one of the upper and lower surfaces 104, 106 as shown in Figures 1 and 2. However, those skilled in the art will appreciate that the central plug 126 can be formed in other shapes without departing from the scope or spirit of the present invention. Furthermore, at least one of the two or more peripheral plugs 128 is oval in cross-section when viewed from one of the upper and lower surfaces 104, 106 as shown in Figures 1 and 2. However, those skilled in the art will also appreciate that any and/or all of the peripheral plugs 128 can be forming in other shapes without departing from the scope or spirit of the present invention. Still further, although the central plug 126 and peripheral plugs 128 are shown having a similar shape as their corresponding openings 122, 124, such is given by way of example only and not to limit the scope or spirit of the present invention. For example, the portion of the plugs 124, 128



disposed in the openings 122, 124, can be the same shape as the opening 122, 124, and the portion of the plugs 126, 128 which extends above the upper and lower surfaces 104, 106 of the body 102 can have a shape which differs from the shape of their corresponding opening 122, 124. Further, the shape of the portion of the plugs 126, 128, extending above the upper surface 104 can differ from the shape of the portion of the plugs 126, 128, extending above the lower surface 106.

In the embodiment shown in Figures 1 and 2, the central plug 126 is circular in cross-section when viewed from one of the upper and lower surfaces 104, 106 and the two or more peripheral plugs 128 comprises three peripheral plugs 128, each of which is oval in cross-section when viewed from one of the upper and lower surfaces 104, 106.

Figure 3 illustrates a hockey puck blank (the disc shaped body 102) before insertion of the central and peripheral plugs 126, 128. As discussed above, the blank can be fabricated separately from the plugs 126, 128 and the plugs inserted therein in a secondary operation. Furthermore, the plugs 124, 128 and/or the disc shaped body 102 can be fabricated from any techniques known in the art, such as by molding or machining. As also discussed above, the plugs 126, 128 can be insert molded in their respective openings of the disc shaped body 102.

While there has been shown and described what is considered to be preferred embodiments of the invention, it will, of course, be understood that various modifications and changes in form or detail could readily be made without departing from the spirit of the invention. It is therefore intended that the invention be not limited to the exact forms described and illustrated, but should be constructed to cover all modifications

that may fall within the scope of the appended claims.